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## A Revision of *Mestocharella* (Hymenoptera, Eulophidae), with Descriptions of Six New Species

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**Abstract** The genus *Mestocharella* GIRAULT is redefined. *M. feralis* GIRAULT, the type species, and *M. javensis* GAHAN are redescribed from the holotypes. Six new species from eastern and southeastern Asia are described. Three species groups are recognized. A key to the species is provided. Host records are given for five new species.

**Key words:** *Mestocharella*; Eulophidae; new species; host records; Asia.

GIRAULT (1913) described the genus *Mestocharella* to include a single species *M. feralis* GIRAULT from Queensland, Australia. In 1922, GAHAN described *M. javensis* reared from *Caloptilia theivola* (WALSINGHAM) in Java. Later BOUČEK (1977) defined this genus in his key to the world genera of Tetrastichinae, and in 1988 he gave further comments including host records of both species.

In this paper *Mestocharella* is redefined and *M. feralis* and *M. javensis* are redescribed on the basis of the holotypes. Structures of the petiole in Eulophidae are briefly discussed. Six new species are described from southern Japan, Taiwan and Eastern Malaysia. Five of them were reared from leaf-mining Lepidoptera by Dr. KUMATA. Unless otherwise stated, the types will be deposited in the Laboratory of Systematic Entomology, Hokkaido University, Sapporo. Morphological terms and measurements follow those of GRAHAM (1987).

I would like to thank Dr. T. KUMATA of Hokkaido University, Sapporo, for the gift of valuable specimens and information on their hosts. I am deeply indebted to Dr. K. LAMBKIN of Queensland Museum, Brisbane, and Dr. M. E. SCHAUFF of Systematic Entomology Laboratory, Washington, D. C., for the loan of type specimens.

### *Mestocharella* GIRAULT

*Mestocharella* GIRAULT, 1913, Mem. Qd. Mus., **2**: 269. Type species: *Mestocharella feralis* GIRAULT, by original designation. GIRAULT, 1913, Bull. Wisc. nat. Hist. Soc. (N.S.), **11**: 41. BOUČEK, 1977, Bull. ent. Res., **67**: 24. BOUČEK, 1988, Australasian Chalcidoidea, p. 672.

**Diagnosis.** Frons without median longitudinal line. Malar sulcus present. Lower margin of clypeus bilobed. Mandibles tridentate (Fig. 6). Antennal toruli situated about in middle of height of head. Antenna long and slender; 1 anellus visible; in female, funicle 4-segmented and clava 2-segmented; in male 4- and 3-

segmented, respectively, but C1 often separated from C2, and flagellum with sub-basal whorls of long setae. Pronotum long; collar most often with transverse carina. Mid lobe of mesoscutum with a longitudinal, irregular depression posteriorly; 3–5 adnotaular setae present on each side. Axillae not advanced. Scutellum with submedian and sublateral lines broad, forming grooves; sublateral grooves most often transversely costate, with outer margin carinate; 2 pairs of setae present. Dorsellum with a median carina (rarely longitudinally rugulose). Propodeum long, strongly carinate, with a large subpentagonal area delimited by strong plicae and anterior oblique carinae (Figs. 5, 9); median carina often forked anteriorly; callus with 2–7 setae; spiracles small, separated by more than their diameter from hind margin of metanotum. Precoxal suture on mesopleuron indicated by longitudinal sculpture or depression. Legs long and slender. Forewing with costal cell very narrow; SM with several dorsal setae; ST short; PM usually about half as long as stigmal. Gastral petiole conspicuous, longitudinally, strongly carinate or rugose, with lateral projections more or less developed (Figs. 2, 9). Basal sternite strongly thickened, projecting forwards and fused with posterior half of petiole; unusually long, strong carinae extending from anterior margin of the sternite (Figs. 3, 13). Gaster usually shorter than thorax, convex, subcircular to elliptical; basal fovea with longitudinal carinae; basal and second tergites usually occupying two-thirds of gaster; longest seta of each cercus much longer than next longest. Tip of hypopygium situated near apex of gaster. Body black and yellowish brown, non-metallic.

*Mestocharella* is a unique genus having the propodeum with a large subpentagonal area delimited by strong carinae, conspicuous, carinate gastral petiole with lateral projections more or less developed, and anteriorly extending basal sternite which is fused with the posterior half of petiole. In addition, the pronotal collar has a transverse carina except in the *kumatai*-group; the female antenna has the four-segmented funicle and two-segmented clava; and the dorsellum usually has a median carina. It is easily distinguished from other genera by these characters.

BOUČEK (1988, p. 443) first mentioned the petiole embraced by the anteriorly projecting basal sternite in Pteromalidae. This type of petiole, however, has hitherto been unknown in Eulophidae. In addition to *Mestocharella* in Eulophidae, species of *Holcopelte* FOERSTER have a very similar petiole but the basal sternite is extending nearly the base of petiole. Furthermore, judging from BOUČEK's (1988) definition of the genus in the key to genera (p. 595, couplet 96) and Fig. 1177 (p. 747), the Australian tetrastichine genus *Ceratoneuropsis* GIRAULT seems to also have a petiole similar to *Mestocharella*. There is another type of petiole which occurs in some undetermined genera of Tetrastichinae having an elongate petiole. It is composed of two rigidly fused parts, a ventrally open, true petiole and a paler, weakly sclerotized, smooth ventral sclerite, possibly a projection of the anterior margin of the basal sternite. Further study of the petiole in Eulophidae may show more complex structures as pointed out in Pteromalidae by BOUČEK (1993, p. 1240).

The species of *Mestocharella* are divided into three groups as defined in the key below: the *kumatai*-, *feralis*- and *javensis*-groups.

The members of *Mestocharella* are parasitic on Lepidoptera, mainly leaf-mining species. The *kumatai*-group has been reared from *Tischeria* (Tischeriidae) and the *feralis*-group from *Pilocrocis* sp. (Pyrilidae). The hosts of the *javensis*-group seem to be restricted to the *Acrocercops*- and *Gracillaria*-groups of Gracillariidae.

### Key to species of *Mestocharella*

(Females and males)

1. Pronotal collar without transverse carina anteriorly; gastral petiole raised behind neck with sharp transverse carina (Figs. 2, 3); scutellum with submedian grooves slightly divergent posteriorly; thorax and gaster yellowish brown (*kumatai*-group) ..... *kumatai* sp. n.
- Pronotal collar with transverse carina anteriorly; gastral petiole not raised behind neck (Fig. 13), sometimes with irregular transverse carina anteriorly; scutellum with submedian grooves slightly convergent posteriorly; thorax and gaster mainly blackish ..... 2
2. Propodeum with paraspircular carinae and with subpentagonal area narrow; petiole slightly longer than broad, with lateral projections ill-developed (Fig. 5) (*feralis*-group) ..... *feralis* GIRAULT
- Propodeum without paraspircular carinae and with subpentagonal area broad; petiole transverse with ear-like, large lateral projections (Figs. 9, 24) (*javensis*-group) ..... 3
3. Scutellum depressed posteriorly between submedian grooves, which are unusually broad (Fig. 24); prepectus with a few irregular transverse carinae; dorsellum longitudinally rugulose; female basal tergite with hind margin slightly emarginate; male scape with short ventral plaque (Fig. 25) ..... *latistriata* sp. n.
- Scutellum not depressed posteriorly, with submedian grooves not so broad; prepectus without transverse carina; dorsellum weakly sculptured with a median longitudinal carina; female basal tergite with hind margin straight; male scape with ventral plaque at least half length of scape. .... 4
4. Female funicle (Fig. 17) stout, with F1 2.2 times as long as broad, flagellum covered with sparse, decumbent setae; antennal toruli situated nearer to lower margin of clypeus than level of vertex (Fig. 16); male scape broadest near base ..... *javensis* GAHAN
- Female funicle usually slender, with F1 more than 2.5 times as long as broad, if stout (Fig. 19) then flagellum covered with relatively dense, less decumbent setae; antennal toruli situated in middle of or higher on head (Fig. 8); male scape broadest in middle or at base. .... 5
5. Tentorial pits deep and distinct (Fig. 8); flagellum slender, with F1 at least

- twice (♀) or 3 times (♂) as long as pedicel (Fig. 11) ..... *tenuicornis* sp. n.
- Tentorial pits small, indistinct; flagellum less slender, with F1 less than twice (♀) or at most 2.4 times (♂) as long as pedicel ..... 6
6. Scutellar submedian grooves relatively broad with distinct costulae (Fig. 12), area between the grooves with somewhat raised sculpture and usually with a trace of median line; propodeal median carina complete, not forked anteriorly, with a small but distinct cup at base; male scape broadest in middle (Fig. 14) ..... *costulata* sp. n.
- Scutellar submedian grooves not broad, without costulae, area between the grooves engraved-reticulate, without median line; propodeal median carina forked anteriorly, without cup anteriorly; male scape broadest below ..... 7
7. Antennae shorter, with pedicel plus flagellum 1.16 (♀) or 2.0 (♂) times breadth of head; male scape broadest near base (Fig. 20); pronotal collar with transverse carina distinctly angulate in middle ..... *rhois* sp. n.
- Antennae longer, with pedicel plus flagellum 1.38 (♀) or 2.58 (♂) times breadth of head; male scape broadest at base (Fig. 22); pronotal collar with transverse carina straight ..... *formosana* sp. n.

*Mestocharella kumatai* sp. n.

(Figs. 1–4)

*Female.* Yellowish brown: head blackish with mouth margin and median depressed area on face paler; flagellum darker; extreme apices of tarsi blackish. Wings subhyaline. A female from Amami-Oshima Is. darker with following parts concolorous with head: pronotum, mesoscutum, scutellum, prepectus and posterior third of gaster. Body length 1.4–1.9 mm.

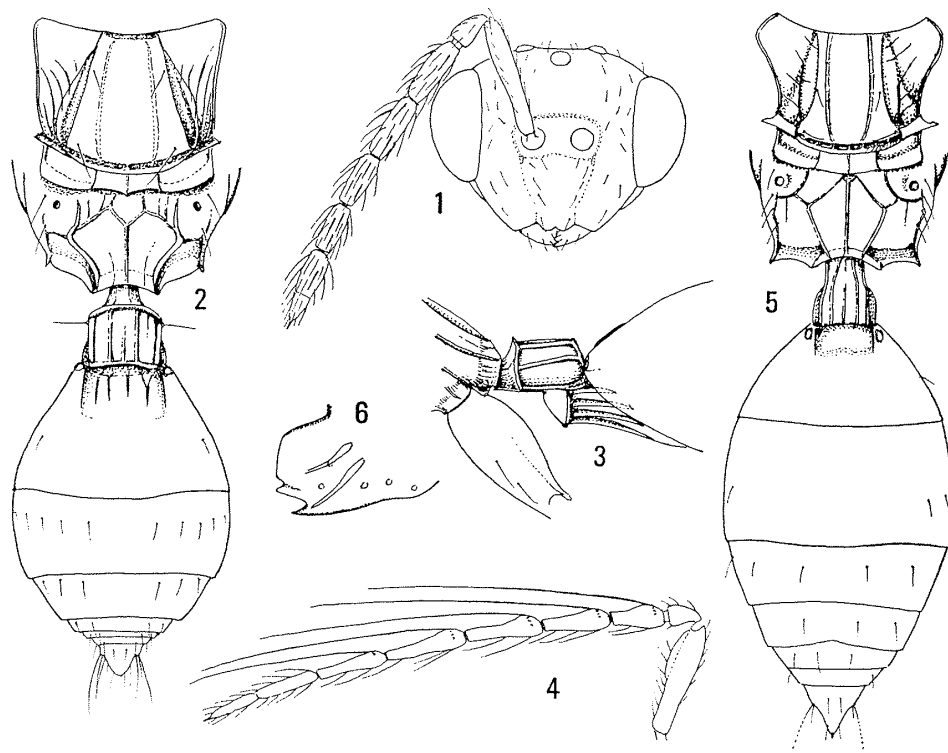
Head in dorsal view 2.0–2.16 times as broad as long; temples about 0.16 length of eyes. Vertex and frons superficially sculptured, shining. Area just behind each lateral ocellus shallowly depressed. Head in front view 1.3–1.4 times as broad as high. Area around antennal toruli shallowly depressed and face medially more weakly so (Fig. 1). Malar sulcus straight; malar space 0.55–0.59 times height of eye. Tentorial pits hardly visible. Eyes bare, separated by 1.3–1.4 times their height. Antennal toruli situated in middle of height of head; scape reaching well above vertex; pedicel plus flagellum 1.45 times breadth of head; F1 and F2 equal in length, about 3 times as long as broad; F4 nearly 2.5 times as long as broad.

Thorax fully 1.8 times as long as broad. Pronotum a little shorter than mesoscutum, 1.4–1.6 times as broad as long, gently declived anteriorly, very weakly sculptured; collar occupying more than half length of pronotum, without transverse carina and rounded anteriorly. Mid lobe of mesoscutum finely imbricate, with vague median longitudinal depression; 3 adnotaular setae on each side. Scutellum (Fig. 2) as long as broad, sculptured as mesoscutal mid lobe, depressed along hind margin; submedian grooves distinct, without costulae, slightly divergent posteriorly;

sublateral grooves broad and smooth, with outer margin not carinate; anterior setae slightly to distinctly before the middle. Dorsellum short, about 4 times as broad as long, almost smooth, with median carina sometimes indistinct. Propodeum (Fig. 2): subpentagonal area almost smooth; median carina always forked anteriorly; plicae high and sharp; anterior oblique carinae connecting plicae and median carina sometimes weak and irregular; callus with 2, sometimes 3 setae. Forewing 2.2 times as long as broad; SM with 5 dorsal setae; M about 1.4 times as long as costal cell, about 8 times length of ST; PM rudimentary; costal cell sublinear, 13 times as long as broad; basal cell bare, open in basal half; speculum almost reduced; disk with rather dense, dark setae.

Gastral petiole distinctly raised behind neck (Fig. 3), the raised area a little broader than long, with sharp, transverse carina anteriorly and with 4 or 5 longitudinal carinae dorsally; lateral projections weak; a pair of setae present anterolaterally. Gaster much shorter than thorax, 1.2–1.5 times as long as broad; basal tergite nearly as long as combined length of second and third tergites; basal fovea with 4–5 carinae rather weak and short; carinae on basal sternite long and strong.

*Male*. Differs from female as follows. Head in dorsal view more transverse, 2.4 times as broad as long. Eyes separated by 1.45 times their height. Antenna (Fig. 4): scape with ventral plaque situated just in distal half of scape, anterior edge



Figs. 1–6. 1–4, *Mestocharella kumatai* sp. n.; 5–6, *M. feralis* GIRAULT, ♀ holotype. — 1, ♀, head and right antenna, front view; 2, 5, ♀, thorax (part), petiole and gaster; 3, ♀, petiole and basal sternite, profile; 4, ♂, left antenna; 6, left mandible.

of scape with several setae; pedicel plus flagellum fully twice breadth of head; F1 1.5–1.6 times as long as pedicel, distinctly shorter than F2, with whorled setae reaching tip of F4. Petiole quadrate. A male from Amami-Oshima Is. also having the same color pattern as the female from Amami-Oshima Is.

Holotype (♀): Yona, Okinawa Is., Ryukyus, em. 17. iii. 1989, ex *Tischeria* sp. on *Eurya emarginata*, (No. 3463) (T. KUMATA). Paratypes: 6 ♀ 2 ♂ with same data as holotype; Yuwan, Amami-Oshima Is., Ryukyus, 1 ♀, 1. v. 1959 (K. KAMIJO); Amami-Oshima Is., 1 ♂, 18. iii. 1964 (H. TAKADA).

*Distribution.* Japan (Ryukyus).

*Host.* *Tischeria* sp. on *Eurya emarginata* MAKINO (Theasceae).

### *Mestocharella feralis* GIRAULT

(Figs. 5–6)

*Mestocharella feralis* GIRAULT, 1913, Mem. Qd. Mus., 2: 269–270; GIRAULT, 1913, Bull. Wisc. nat. Hist. Soc. (N.S.), 11: 41; BOUČEK, 1988, Australasian Chalcidoidea, p. 672.

This species is described from one female specimen taken in Queensland, Australia. I have seen the holotype, which is point mounted and the head is slide mounted. DAHMS (1984) mentions that the right forewing is separated, upside down buried in the copious glue. I was, however, unable to find it under a stereomicroscope of 100 magnifications. The thorax and gaster except the wings and legs are in good condition. In regard to other data and conditions of the holotype, see DAHMS (1984, p. 594 & pp. 747–748).

Redescription of the holotype: Thorax and gaster dark brown (shining black in the original description); basal spot on gaster elongate, extending slightly beyond hind margin of second tergite; gaster ventrally mainly brownish yellow. Legs brownish yellow with hind coxae slightly darker. Wings hyaline. Body length nearly 1.2 mm.

Tentorial pits large. Antennal toruli situated about in middle of height of head, separated from each other by their diameter. Antenna: 1 anellus present; pedicel plus flagellum about as long as thorax; pedicel 1.5 times as long as broad; F1 2.5 times as long as broad; relative lengths of pedicel, F1, F2, F3, F4 and clava as 2.8: 4.8: 5.0: 5.0: 4.0: 7.0.

Thorax slender, 1.75 times as long as broad. Pronotum nearly as long as mesoscutum, 1.72 times as broad as long; collar long, medially more than one-third length of mesoscutum, coarsely granulate with smooth strip posteriorly; anterior carina sharp medially. Mesoscutum: mid lobe very coarsely granulate anteriorly, densely and longitudinally so posteriorly, shining, with median longitudinal depression vague; 2 adnotaular setae visible on left side; scapulae with superficial engraved reticulation. Scutellum longer than broad (Fig. 5), with fine engraved reticulation, having areoles much longer than broad; areas outside submedian grooves superficially sculptured; submedian grooves with very weak costulae; sub-

lateral grooves very broad with a few transverse costulae, outer margin carinate in posterior two-thirds; hind margin of scutellum strongly depressed. Dorsellum with median carina weak. Propodeum almost smooth and shining, with carinae delimiting subpentagonal area rather weak; subpentagonal area narrow, with median carina almost complete; paraspiracular carina present; postero-lateral corners of propodeum prominent; callus with 4 setae. Forewing: ST about 0.11 length of M; PM a little longer than half length of ST; speculum of moderate size, almost open below; disc beyond speculum with sparse setae.

Gastral petiole slightly shorter than median length of propodeum, slightly longer than broad with 5 longitudinal carinae; lateral projections ill-developed. Gaster a little longer than thorax, 1.8 times as long as broad; basal fovea with carinae only along its lateral margins.

*Male.* Not examined. According to BOUČEK (1988), the male scape is broadest at an apical quarter.

*Distribution.* Australia: Queensland. Solomon Islands: Kolombangara.

*Host.* BOUČEK (1988) states that this species has been reared from *Pilocrocis* nr. *cruciferalis* in Solomons.

*Mestocharella tenuicornis* sp. n.

(Figs. 7–11)

*Female.* Body blackish: gaster dorsally with basal spot brownish yellow, extending to posterior one-third of second tergite; gaster ventrally mainly yellowish brown. Antennae and legs brownish yellow: flagellum and all coxae slightly darker; tarsi with last segment blackish. Wings hyaline. Body length 2.0–2.5 mm.

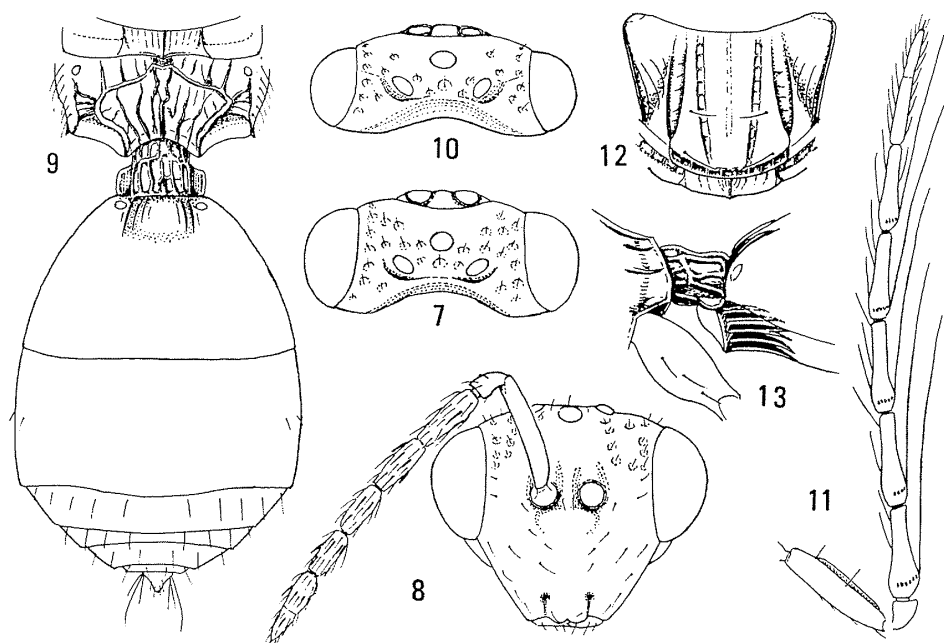
Head in dorsal view (Fig. 7) transverse, about 2.2 times as broad as long. Vertex and frons finely, transversely sculptured, with scattered piliferous punctures; area just behind each lateral ocellus depressed, its hind margin sharply edged. Head in front view (Fig. 8) 1.28 times as broad as high. Malar space 0.78 times height of eye. Face convex below antennal toruli (cf. Fig. 14), weakly sculptured, almost smooth medially including clypeus; tentorial pits distinct. Eyes bare, separated by nearly 1.5 times their height, with inner orbits subparallel. Antennal toruli distinctly nearer to level of vertex than to lower margin of clypeus. Scape reaching distinctly above vertex; pedicel plus flagellum 1.33 times breadth of head; F1 twice as long as pedicel or more, about 3 times as long as broad; F4 much shorter than F1, more than twice as long as broad.

Thorax nearly 1.6 times as long as broad. Pronotum 0.63 times as long as mesoscutum and 2.2 times as broad as long; collar sharply carinate anteriorly, densely sculptured with longitudinal carinae laterally. Mid lobe of mesoscutum convex, with somewhat irregular, strongly raised reticulation, becoming denser anteriorly, and longitudinally rugulose along hind margin; median longitudinal depression shallow and irregular; 3 adnotaular setae on each side; notuali very

deep. Scapulae imbricate. Scutellum convex, as long as broad, with irregular engraved reticulation, with areoles much longer than broad; submedian grooves rather broad, weakly convergent posteriorly, with many weak transverse costulae; sublateral grooves 5.5 times as long as broad, transversely costate, with outer margin sharply carinate; groove along hind margin of scutellum deep with costulae; anterior setae about in middle. Dorsellum 0.4 times as long as propodeum, somewhat angulate posteriorly, with some longitudinal rugulae besides distinct median carina. Propodeum (Fig. 9): subpentagonal area large, with rugulae besides strong carinae; median carina irregular or almost complete; callus with 4–6 setae. Forewing 2.3 times as long as broad; SM with 6–7 dorsal setae; M 1.1 times as long as costal cell; ST less than 0.12 times as long as M; PM rudimentary; basal cell bare, open below; speculum small, closed below.

Gastral petiole 0.7 times as long as propodeum; portion behind neck 2.3 times as broad as long, with longitudinal irregular carinae or rugose sculpture. Gaster a little shorter than thorax, about 1.4 times as long as broad; basal fovea with strong carinae laterally; basal and second tergites subequal in length.

*Male.* Differs from female as follows. Body length 2.2 mm. Head in dorsal view (Fig. 10) 2.4 times as broad as long. Eyes separated by 1.7 times their height; malar space 0.9 times height of eye. Antenna (Fig. 11): scape 3.5 times as long as broad, with ventral plaque 0.65 length of scape, hardly sinuate in front view;



Figs. 7–13. 7–11, *Mestocharella tenuicornis* sp. n.; 12–13, *M. costulata* sp. n., ♀. — 7, ♀, head, dorsal view; 8, ♀, head and right antenna, front view; 9, ♀, propodeum, petiole and gaster; 10, ♂, head, dorsal view; 11, ♂, left antenna; 12, scutellum and dorsellum; 13, petiole and basal sternite, profile.



pedicel plus flagellum 2.3 times breadth of head; pedicel slightly longer than broad; flagellum extremely slender; F1 long, 3.1 times as long as pedicel, a little shorter than F2, with whorled setae reaching tip of F3.

Holotype (♀): Kozagawa, Wakayama-ken, Honshu, em. 9. vi. 1970, ex *Acrocercops melanoplecta*, (No. 1034) (T. KUMATA). Paratypes: 1 ♀ 1 ♂ with same data as holotype but the male em. 10. vi. 1970.

*Distribution.* Japan (Honshu).

*Host.* *Acrocercops melanoplecta* MEYRICK on *Castanopsis cuspidata* SCHOTTKY (Fagaceae).

### *Mestocharella costulata* sp. n.

(Figs. 12–14)

This species is very close to *M. tenuicornis* sp. n., from which it differs in the female as follows.

*Female.* Body length 1.5–2.2 mm. Head in front view 1.2–1.3 times as broad as high. Malar space 0.7–0.75 times height of eye. Tentorial pits hardly visible or absent. Antenna with F1 1.7 times as long as pedicel, 2.4–2.7 times as long as broad. Pronotum with collar almost smooth in posterior half. Mesoscutal mid lobe with 4–5 adnotaular setae on each side; median longitudinal depression more distinct. Scutellum (Fig. 12) rather strongly, irregularly sculptured, usually with a trace of median, longitudinal line; submedian grooves very broad with distinct costulae; areas outside submedian grooves aciculate sculptured. Dorsellum almost smooth, shining, with median carina conspicuous. Propodeum: median carina complete with a cup at base; callus with 4–7 setae. Petiole with 5 irregular strong carinae; portion behind neck nearly 3 times as broad as long.

*Male.* Differs from female as follows: body length 1.9 mm. Head in dorsal view 2.25 times as broad as long. Eyes separated by 1.65 times their height. Malar space 0.8 times height of eye. Antenna (Fig. 14): scape 3.2–3.4 times as long as broad, with ventral plaque 0.67 length of scape, distinctly sinuate in front view; pedicel plus flagellum about twice breadth of head; F1 1.5 times as long as pedicel, 0.7 times length of F2. Scutellum without a trace of median line.

Holotype (♀): Kozagawa, Wakayama-ken, Honshu, em. 14. x. 1974, ex *Caloptilia kadsurae*, (No. 1314) (T. KUMATA). Paratypes: 6 ♀ 2 ♂ with same data as holotype.

*Distribution.* Japan (Honshu).

*Host.* *Caloptilia kadsurae* KUMATA on *Kadsura japonica* DUNAL (Schisandraceae).

The male of *M. costulata* differs from that of *M. tenuicornis* in having the less slender flagellum with the first funicle segment much shorter than the second segment, scape with ventral plaque distinctly sinuate in front view, tentorial pits indistinct, and pronotal collar almost smooth posteriorly.

*Mestocharella javensis* GAHAN

(Figs. 15–18)

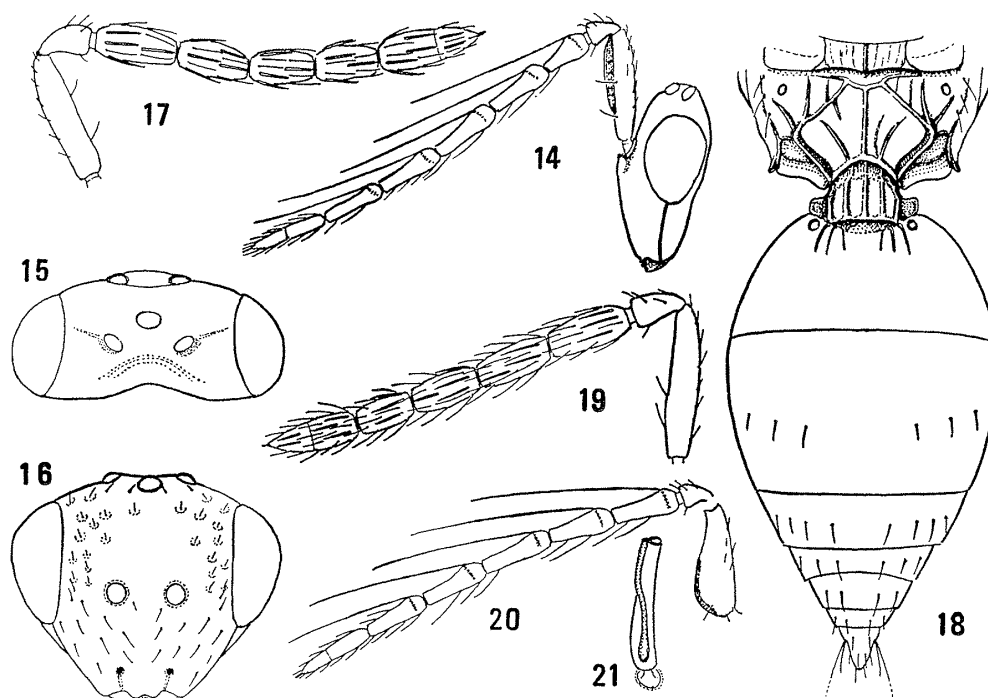
*Mestocharella javensis* GAHAN, 1922, *Treubia*, 3: 48–49; BOUČEK, 1977, *Bull. ent. Res.*, 67: 24.

GAHAN (1922) described this species from three female specimens. I have seen the holotype and one paratype, both labelled “Reared from *Gracilaria theivola*”, “Buitenzorg Java”, “S. LEEFMANS, Let. 27. Nov. '19”. The holotype is further labelled “Type No. 24652, U.S.N.M.” and “*Mestocharella javensis* GAHAN, ♀ Type”, and the paratype “Paratype No. 24652, U.S.N.M.”. Both type specimens are in good condition except for the wings. The following redescription is based upon them.

*Female.* Body blackish brown: face and clypeus brownish; gaster dorsally with pale basal spot of moderate size, ventrally extensively pale yellow. Antennae and legs pale yellow: fore and hind coxae brownish; tips of tarsi infuscate; in holotype flagellum darker apically. Wings hyaline. Body length 1.7–1.8 mm.

Head in dorsal view (Fig. 15) rather thick, 2.1 times as broad as long; depression just behind each lateral ocellus shallow and indistinct; a weak depressed line extending from lateral ocellus to eye; vertex and frons superficially sculptured with scattered, indistinct piliferous punctures. Head high, in front view (Fig. 16) 1.2 times as broad as high. Face below antennal toruli convex, almost smooth, with dense sculpture laterally; clypeus smooth; tentorial pits rather large, distinct. Eyes separated by 1.43 times their height. Malar space 0.7 times height of eye. Toruli nearer to clypeal lower margin than to vertex, widely separated from each other, with interspace almost flat. Antenna (Fig. 17): scape a little shorter than eye height, reaching slightly above level of vertex; pedicel plus flagellum about 1.3 times breadth of head; funicle stout, F1 2.2 times as long as broad, F4 less than twice as long as broad; flagellum with sparse, decumbent setae.

Thorax 1.55 times as long as broad. Pronotum 2.2 times as broad as long; collar long, medially about a quarter length of mesoscutum, weakly sculptured with weak longitudinal carinae extending from sharp transverse carina; posterior smooth strip nearly half median length of collar. Mid lobe of mesoscutum with coarse, strongly raised reticulation, becoming irregular and weaker posteriorly; median depression distinct though irregular; 3 adnotaular setae on each side. Scapulae rather coarsely imbricate. Scutellum quadrate, finely engraved-reticulate, with areoles much longer than broad; anterior setae situated before middle; submedian grooves rather broad without costulae; sublateral grooves with a few, weak costulae and with outer margin carinate. Dorsellum weakly sculptured with strong median carina. Propodeum (Fig. 18): subpentagonal area broad, mostly smooth and shining with a few carinae besides median carina, which is complete in the holotype and is forked at anterior one third in the paratype; plicae quite high and sharp in posterior half; callus with 3 setae. Forewing: SM with 4–5 dorsal setae; basal cell bare, open below; speculum relatively large, closed below; M 1.2 times as long as



Figs. 14–21. 14, *Mestocharella costulata* sp. n., ♂; 15–18, *M. javensis* GAHAN, ♀; 19–21, *M. rhois* sp. n. — 14, head and left antenna, profile; 15, head, dorsal view; 16, head, front view; 17, right antenna; 18, propodeum, petiole and gaster; 19, ♀, left antenna; 20, ♂, left antenna; 21, ♂, left scape, front view.

costal cell; ST about 0.12 length of M; PM about half length of ST.

Petiole with 5 irregular longitudinal carinae; lateral projections well-developed. Gaster a little longer than thorax, with apex acute; basal tergite slightly shorter than second tergite; 6–8 carinae extending from hind margin of basal fovea.

*Male.* Not examined. According to BOUČEK (1988), the scape is broadest basally.

*Distribution.* Indonesia (Java); India.

*Host.* *Caloptilia theivola* (WALSINGHAM) on tea. BOUČEK (1977) recorded from Pakistan an undetermined leaf miner on *Eugenia cumini* (Myrtaceae) as host of *M. javensis*. This record, however, seems to need confirmation as to the parasite identification.

*M. javensis* is characterized by having the head high, 1.2 times as broad as high in front view, antennal toruli widely apart and situated low on head, female flagellum with sparse, decumbent setae, collar long, and plicae quite high and sharp.

*Mestocharella rhois* sp. n.

(Figs. 19–21)

The female of this species is similar to that of *M. tenuicornis* but differs as follows.

*Female.* Body length 2.1–2.5 mm. All legs brownish yellow. Head in dorsal view more transverse, 2.3–2.4 times as broad as long, with occiput only weakly emarginate. Eyes larger, separated by 1.35–1.38 times their height. Malar space 0.70–0.73 times height of eye. Tentorial pits visible but indistinct. Antennal toruli situated in middle of height of head; pedicel plus flagellum about 1.2 times breadth of head; F1 1.6–1.7 times as long as pedicel, 2.3–2.5 times as long as broad; F4 twice as long as broad (Fig. 19). Pronotal collar with transverse carina distinctly angulate in middle. Mid lobe of mesoscutum with slightly raised reticulation; 4 adnotaular setae on each side. Scutellum with submedian grooves without costulae. Dorsellum almost smooth, with strong median carina. Callus with 5 setae. Forewing with ST about 0.14 times length of M; PM nearly half as long as ST. Petiole usually with distinct transverse carina anteriorly. Gastral basal fovea with short carinae extending from the hind margin, which is irregularly carinate at least laterally.

*Male.* Differs from female as follows. Body length 1.9 mm. Head more transverse; eyes separated by 1.54 times their height. Antenna (Fig. 20): scape 2.7 times as long as broad, with ventral plaque extending from base to apex, strongly sinuate (Fig. 21); pedicel plus flagellum twice breadth of head; F1 twice as long as pedicel, nearly as long as F2.

Holotype (♀): Uehara, Iriomote Is., Ryukyus, em. 17. xi. 1989, ex *Caloptilia elongata* (No. 3604) (T. KUMATA). Paratypes: 2 ♀ 1 ♂ with same data as holotype.

*Distribution.* Japan (Ryukyus).

*Host.* *Caloptilia elongata* KUMATA on *Rhus succedanea* L. (Anacardiaceae).

This species is characterized by the toruli situated in the middle of head, the collar with the transverse carina distinctly angulate in middle, the weakly sculptured mesoscutum, the basally swollen male scape and the relatively short female antenna.

*Mestocharella formosana* sp. n.

(Figs. 22–23)

*Female.* Color as in *M. tenuicornis* but pedicel and flagellum blackish, fore and hind coxae slightly darker basally, hind tarsi with last segment blackish and third segment darker, gaster with basal spot smaller, extending to middle of second segment. Body length 2.2 mm.

Head in dorsal view 2.2 times as broad as long; depression behind each lateral ocellus shallow, not sharply edged posteriorly; vertex and frons with only a few, vague piliferous punctures on each side; face densely engraved-reticulate throughout.

Eyes separated by 1.5 times their height. Malar space 0.84 times height of eye. Tentorial pits visible but not large. Antennal toruli nearer to level of vertex than to lower margin of clypeus. Antenna: flagellum long, combined length of pedicel and flagellum nearly 1.4 times breadth of head; F1 1.8 times as long as pedicel, 2.25 times as long as broad; F2 as long as F1; F4 a little shorter than F1, nearly twice as long as broad.

Thorax slender, nearly 1.7 times as long as broad. Pronotum twice as broad as long; collar with transverse carina straight, quite high, behind which longitudinal carinae are almost absent. Mid lobe of mesoscutum with strong and rather coarse reticulation, becoming denser anteriorly; 4 adnotaular setae on each side; shallow and broad longitudinal depression present in posterior one-third. Scutellum slightly longer than broad, rather flattened, densely engraved-reticulate, shining; submedian grooves narrow, ill-defined, broadly apart anteriorly; sublateral grooves broad, costulate, with outer margin carinate; anterior setae situated just behind middle of scutellum. Dorsellum with median carina weak. Propodeum: subpentagonal area elongate, almost smooth, with 1 carina between median carina and plicae; median carina branched anteriorly; about 3 carinae extending from anterior oblique carina to hind margin of metanotum at each side; callus with 4 setae. Forewing: M 1.33 times as long as costal cell; ST 0.12 times length of M, about twice as long as PM; basal cell closed below in apical one-third; speculum almost reduced; setae on disk blackish, dense.

Petiole long, only slightly shorter than median length of propodeum, a little broader than long, with 5 irregular carinae with interspaces smooth. Basal sternite more produced forwards than that of *costulata*, hence longitudinal carinae long. Gaster a little shorter and narrower than thorax, 1.8 times as long as broad. Basal tergite slightly longer than second tergite, both occupying three-fourths length of gaster; basal fovea with several rather strong carinae.

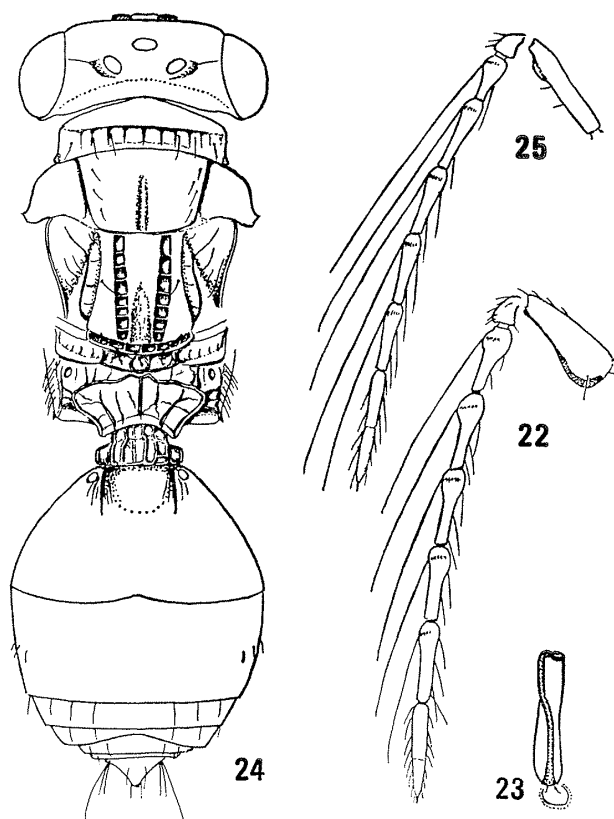
*Male.* Differs from female as follows. Antennae with funicle dark brown; clava blackish; gaster with basal spot small. Body length 1.8 mm. Head in dorsal view 2.35 times as broad as long. Antenna (Fig. 22): scape strongly swollen basally, 2.35 times as long as broad; ventral plaque extending from base to apex, strongly sinuate in front view (Fig. 23); pedicel plus flagellum 2.6 times breadth of head; each funicle segment and C1 subequal in length, except that F1 is slightly shorter (9.3: 11); funicle segments strongly nodulose. Thorax more slender, 1.76 times as long as broad; mesoscutum and scutellum with sculpture much weaker; 3 adnotaular setae on each side. Propodeum with subpentagonal area narrower.

Holotype (♀): Hohuanchi-Sungchuankang, Nantou Hsien, Taiwan, 24. vi. 1976 (H. MAKIHARA). Paratype: 1 ♂ with same data as holotype.

*Distribution.* Taiwan.

*Host.* Unknown.

*M. formosana* sp. n. shares with *M. rhois* sp. n. the male scape which is the broadest basally with a long, sinuate ventral plaque. It is distinguished from *M.*



Figs. 22–25. 22–23, *Mestocharella formosana* sp. n., ♂; 24–25, *M. latistriata* sp. n. — 22, 25, ♂, left antenna; 23, left scape, front view; 24, ♀, body.

*rhois*, in addition to the characters mentioned in the key, by the petiole which is nearly as long as the propodeum, slender thorax, less transverse head, vertex and frons with piliferous punctures superficial, almost reduced speculum, and male funicle segments which are strongly nodulose.

***Mestocharella latistriata* sp. n.**

(Figs. 24–25)

*Female.* Body blackish: propodeum dark brown posteriorly; petiole yellowish brown; gaster dorsally with basal spot restricted to first tergite, ventrally brownish in basal half. Scape and pedicel brownish yellow, flagellum much darker. Legs brownish yellow with apices of tarsi darker. Forewing with a large, fuscous cloud below marginal vein. Body length 1.8–2.0 mm.

Head in dorsal view thin, 2.45 times as broad as long, with face only weakly produced forwards; temples completely absent (Fig. 24); depression just behind each lateral ocellus with hind margin not sharply edged. Head in front view 1.34 times as broad as high. Eyes separated by 1.5 times their own height. Malar

space about 0.76 times height of eye. Tentorial pits large and distinct. Sculpture on head as in *tenuicornis* but gena with a few longitudinal rugae and posterior margin of gena with lamina. Antennal toruli situated in middle of height of head; combined length of pedicel and flagellum 1.24 times breadth of head; flagellum slender; F1 about 1.9 times as long as pedicel, 2.8–3.0 times as long as broad; F4 about 0.75 times as long as F1, 2.5 times as long as broad.

Thorax robust, 1.4 times as long as broad. Pronotum a little shorter than mesoscutum (11: 13), about 2.4 times as broad as long; collar with many longitudinal carinae extending from strong transverse carina. Mesoscutum only weakly convex in longitudinal axis; mid lobe strongly rugose with deep longitudinal depression; 3 or 4 adnotaular setae on each side; scapulae imbricate. Scutellum as long as broad, longitudinally, finely rugulose and depressed posteriorly between submedian grooves, which are unusually broad with many transverse costae (Fig. 24); sublateral grooves broader than submedian; hind transverse groove broad and longitudinally costate. Dorsellum longitudinally rugulose. Propodeum hardly produced beyond insertion of hind coxae; subpentagonal area large and flat, with interspaces from punctate-reticulate to irregularly rugulose; median carina complete or branched; callus with 5–7 setae. Prepectus irregularly rugulose, with 1 or 2 irregular transverse carinae. Metapleuron strongly rugose. Forewing 2.3 times as long as broad; SM with 5–6 dorsal setae; M about as long as costal cell, distinctly thickened basally; ST 0.15–0.18 times as long as M; PM about half as long as ST; basal cell closed in apical half; disc beyond small speculum with blackish, rather dense setae.

Petiole with longitudinal, irregular carinae; lateral projections well-developed. Basal tergite of gaster a little longer than second tergite, with hind margin slightly emarginate medially; basal fovea deep, delimited laterally by a pair of strong carinae.

*Male.* Differs from female as follows. Body length 1.2 mm. Propodeum brownish; fore coxae black, mid and hind coxae darker. Antenna (Fig. 25): scape slender with short ventral plaque apically; pedicel plus flagellum twice breadth of head; F1 slightly longer than pedicel, 0.63 times as long as F2. Callus with 4 setae. Gaster much shorter than thorax, 1.3 times as long as broad; hind margin of basal tergite straight.

Holotype (♀): Bake National Park near Kuching, Sarawak, Eastern Malaysia, em. 30. x. 1991, ex *Acrocercops*-group (No. 4371) (T. KUMATA). Paratypes: 2 ♀ 1 ♂ with same data as holotype but em. 28–30. x. 1991. Holotype and one female paratype deposited in Forest Research Institute of Malaysia, Kepon.

*Distribution.* Eastern Malaysia (Sarawak).

*Host.* Species belonging to undescribed genus of *Acrocercops*-group on *Drypetes* sp. (Euphorbiaceae).

*M. latistriata* is a distinct species having the strongly sculptured thorax, prepectus with one or two transverse carinae, dorsellum with median longitudinal rugulae; basal tergite in female with emarginate hind margin; slender female flagellum; and forewing with a fuscous cloud below marginal vein.

## References

- BOUČEK, Z., 1977. Descriptions of *Tachinobia* gen. n. and three new species of Tetrastichinae (Hymenoptera: Eulophidae), with a tentative key to genera. *Bull. ent. Res.*, **67**: 17–30.
- 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. 832 pp., CAB International, Wallingford, UK.
- 1993. New taxa of North American Pteromalidae and Tetracampidae (Hymenoptera), with notes. *J. nat. Hist.*, **27**: 1239–1313.
- DAHMS, E. C., 1984. A checklist of the types of Australian Hymenoptera described by Alexandre Arsene GIRAULT: III. Chalcidoidea species F–M with advisory notes. *Mem. Qd. Mus.*, **21**: 579–842.
- GAHAN, A. B., 1922. Report on a small collection of parasitic Hymenoptera from Java and Sumatra. *Treubia*, **3**: 47–52.
- GIRAULT, A. A., 1913. Australian Hymenoptera Chalcidoidea—IV. The family Eulophidae with descriptions of new genera and species. *Mem. Qd. Mus.*, **2**: 140–296.
- GRAHAM, M. W. R. de V., 1987. A reclassification of the European Tetrastichinae (Hymenoptera: Eulophidae), with a revision of certain genera. *Bull. Br. Mus. nat. Hist. (Ent.)*, **55**: 1–392.

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